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AIRCRAFT MEASUREMENTS IN THE COUPLED BOUNDARY LAYERS AIR-SEA TRANSFER (CBLAST) LIGHT WIND PILOT FIELD STUDY

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List of Abbreviations and Acronyms

A/D	Analog-to-Digital
ARA	Airborne Research Australia
ARL	Air Resources Laboratory
ASCII	American Standard Code for Information Interchange
BAT	“Best” Aircraft Turbulence
CBLAST	Coupled Boundary Layers Air-Sea Transfer
CG	Center of Gravity
DGPS	Differential Global Positioning System
DRI	Defense Research Initiative
DSP	Design Stagnation Point
ELT	Emergency Locator Transmitter
FAA	Federal Aviation Administration
FUST	Fast Ultra-Sensitive Temperature
GOES	Geostationary Operational Environmental Satellite
GPS	Global Positioning System
IR	Infrared
IRGA	Infrared Gas Analyzer
MABL	Marine Atmospheric Boundary Layer
MVCO	Martha’s Vineyard Coastal Observatory
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
netCDF	Network Common Data Format
NOAA	National Oceanic and Atmospheric Administration
OAR	Office of Atmospheric Research
ONR	Office of Naval Research
PAR	Photosynthetically Active Radiation
PC	Personal Computer
PSP	Precision Spectral Pyranometer
REM	Remote
SAR	Synthetic Aperture Radar
SST	Sea Surface Temperature
TANS	Trimble Advanced Navigation System
UTC	Coordinated Universal Time
UW	University of Washington
WHOI	Woods Hole Oceanographic Institution

List of Symbols and Variables

α_0	Angle of Attack at Zero Lift
ψ_h	Heading Offset for Relative Velocity
ψ_p	Pitch Offset for Relative Velocity
ψ_q	Adjustment to Dynamic Pressure
ψ_r	Roll Offset for Relative Velocity
g	Gravitational Acceleration Constant (9.81 m s^{-2})
K_α	Pitch Calibration Constant
K_β	Yaw Calibration Constant
K_{up}	Upwash Factor
mss	Mean Square Slope
R_T	Temperature Recovery Factor
r	Linear Calibration Coefficient
SE	Standard Error
θ	Accelerometer Angle

Abstract

A research aircraft was used in the low-wind pilot field study of the Coupled Boundary Layers Air-Sea Transfer (CBLAST) Departmental Research Initiative (DRI) to acquire high-resolution *in situ* atmospheric turbulent fluxes in the marine atmospheric boundary layer while simultaneously documenting the characteristics of the surface wave field with various remote sensors. The CBLAST-Low pilot study was successfully conducted during a three-week period from late July to early August 2001 off the south shore of Martha's Vineyard Island, Massachusetts. Twenty missions (~ 48 flight hours) were flown by the LongEZ (registration N3R) on days with light winds (< 7 m s^{-1}) under various atmospheric stabilities. Data acquired by N3R in CBLAST-Low will support the test and refinement of parameterizations used in air-sea models for light wind regimes. In addition, such measurements will provide important boundary conditions to determine boundary layer turbulence and other atmospheric processes controlling the exchange of energy across the air-sea interface. This report summarizes the data acquired by N3R in the CBLAST-Low pilot field study.